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**IMPROVED JOINT FOR BULLET TRAPS**

**TO THE COMMISSIONER OF PATENTS AND TRADEMARKS:**

Your petitioners, Thomas Marshall, Lane Jackson, Addison Sovine and Kyle Bateman, all citizens of the United States and residents of Utah, having a post office address at P.O. Box 636, Provo, Utah 84606, pray that letters patent may be granted to them as inventors of the improvement in an Improved Joint for Bullet Traps as set forth in the following specification.

## BACKGROUND OF THE INVENTION

### 1. Field of the Invention

[0001] The present invention relates to joint strips which are used on bullet traps. More particularly, the present invention relates to such joint strips which reduce the risk of splatter through between two walls of a bullet trap and which lessen the cost of manufacturing the joint strips.

### 2. State of the Art

[0002] In order to maintain proficiency in the use of firearms, it is common for law enforcement officers and sportsmen to engage in target practice. In conventional target practice, a target, i.e. an outline of a person or animal is held before a bullet trap. The bullet receives bullets fired at the target and contains the bullet so that it may be retrieved and recycled.

[0003] Any steel bullet trap, however, requires a joint where two ends of a section meet. This joint has traditionally been made in the manner shown in FIGS. 1 and 2. A bullet trap wall 8 or 8' is formed by a flat strip of steel 10 is used for the front side facing the shooter. The strip 10 typically either has bolts 12 welded to the back side, or countersunk holes 14 for bolts to drop through. A washer 16 or leg (not shown) is used on the back side in conjunction with a nut 20 to secure a bolt 22. As the nut 20 is tightened on the bolt 22, the plate 10 and washer 16 or leg 18

pinch two adjoining pieces of steel plate 26 together. During this process, the plate 10 and the washer 16 or leg 18 are disposed generally parallel with the steel plates 26.

**[0004]** Such configurations have several problems. First, the vibration which accompanies a round hitting a steel plate eventually causes the weld to fail, thereby allowed the welded bolts break off. While bolts placed in countersunk holes generally do not break off, it is difficult to manufacture joints with countersunk holes.

**[0005]** Yet another problem with both of these configurations, is that the front strip can eventually curve away from the pieces of steel plate and increase the risk that a bullet will pass through the space between the steel plates 26. The resulting splatter through can be dangerous to those in the area. Additionally, it may allow lead bullets outside of the range where they may leach lead into the environment.

**[0006]** Thus, there is a need for a new method of forming joint strips. Such a configuration should be less susceptible to breaking of bolts and less expensive/difficult than countersinking bolts.

## SUMMARY OF THE INVENTION

[0007] Thus, it is an object of the present invention to provide an improved bullet joint strip and method for making the same.

[0008] The above and other object of the invention are achieved by a bullet joint strip which can be more readily attached without breaking and which can decrease the risk of splatter through. In accordance with one aspect of the invention, at least one, and typically a plurality of brackets are attached to the back of a facing strip. This is typically accomplished by welding the brackets to the facing strip.

[0009] The brackets are configured to receive an end of the bolt so that the bolt can be tightened to bring the facing strip into secure engagement with adjacent steel plates forming the joint. Because a much larger area of the bracket can be welded to the facing strip than is typically done with the head of a bolt, the risk that the weld will brake is significantly reduced.

[0010] In accordance with another aspect of the present invention, the facing strip is beveled to that it has two outwardly and rearwardly sloping walls. As the bolt of the joint strip is tightened, the pitched nature of the facing strip causes the ends of the facing strip to come into contact with the adjacent plates forming the joints. Because the ends of the facing strip first engage the plates, the risk that the ends will

curl and pull away from the plates is significantly reduced. To the contrary, the ends of the facing strip tend to be in a compression state against the plates, further reducing the risk of splatter through.

[0011] In accordance with still yet another aspect of the present invention, the a flat facing plate is used in conjunction with an angle joint plate to minimize bullet impacts on the angle joint plate and thereby reduce the risk of splatter through.

#### **BRIEF DESCRIPTION OF THE DRAWINGS**

[0012] The above and other objects, features and advantages of the invention will become apparent from a consideration of the following detailed description presented in connection with the accompanying drawings in which:

[0013] FIG. 1 shows a cross-sectional view of a bullet trap joint made in accordance with the teachings of the prior art wherein the head of a bolt is welded to a facing strip;

[0014] FIG. 2 a cross-sectional view of an alternate embodiment of a prior art bullet trap joint, wherein the bolt is positioned in a countersunk hole;

[0015] FIG. 3 shows a cross-sectional view of a bullet trap joint made in accordance with the teachings of the present invention;

[0016] FIG. 4 shows a top view of a joint for holding plates

in a perpendicular arrangement in accordance with the present invention;

[0017] FIG. 5 shows a rear view of the joint strip shown in FIG. 3;

[0018] FIG. 6 shows a side view of the facing plate shown in FIG. 4;

[0019] FIG. 6A shows a rear view of the facing plate shown in FIGS. 4 and 6;

[0020] FIG. 6B shows an end view of the facing plate shown in FIGS. 6 and 6A;

[0021] FIG. 7 shows a side view of the angle joint shown in FIG. 4;

[0022] FIG. 7A shows another side view of the angle joint of FIG. 4; and

[0023] FIG. 7B shows an end view of the angle joints of FIGS. 4, 7 and 7A.

#### **DETAILED DESCRIPTION**

[0024] Reference will now be made to the drawings in which the various elements of the present invention will be given numeral designations and in which the invention will be discussed so as to enable one skilled in the art to make and use the invention. It is to be understood that the following description is only exemplary of the principles of the present invention, and should

not be viewed as narrowing the pending claims.

**[0025]** Referring to FIG. 3, there is shown a cross-sectional view of a joint, generally indicated at 30, made in accordance with the principles of the present invention. As mentioned above, the joints of the prior art suffer from several problems. One significant problem is that welded bolt heads as used in the prior art have a tendency to brake. The bolt heads provide relatively little area to form a weld and are subject to vibration caused by bullets hitting the bullet trap.

**[0026]** Another problem with the prior art is that forming countersunk holes in plate steel or other bullet resistant materials is expensive and time consuming. Yet another problem with both alternate configurations of the prior art is that the lateral edges of the facing strip have a tendency to curl up, weakening support for the associated plates and increasing the risk of splatter through.

**[0027]** These problems are resolved by the joint 30 which is shown in FIG. 3. The joint 30 has a bent facing strip 34 which extends away from the wall toward the middle of the strip. In other words, the joint strip has two outwardly and rearwardly sloping walls 34a from a central longitudinal axis. Preferably, the bend provides an angle of about 12.5 degrees.

**[0028]** The bend in the facing strip 34 prevents the strip from curving away from the steel plates 26 and keeps the lateral edges

34b of the facing strip engaging the plates. Because of the tight engagement, the facing plate 34 is less likely to let small bullet fragments pass through opening between the plates 26.

**[0029]** The joint strip 36 formed by the facing plate 34 also has a bracket 38 welded to the back side. The bracket 38 is configured with an opening 38a (FIG. 5) so that a bolt 42 slides into this bracket. The bolt 42 also engages a backing plate or a washer 46 to secure the facing strip to the plates 26. This makes it simple to replace a broken bolt without replacing the entire strip 34.

**[0030]** The bracket 38 preferably has more than two inches of weld coverage attaching it to the facing strip 34. This is contrast to the small amount of weld coverage provided by the head of a bolt and prevents the bracket 38 from breaking away from the strip 34 due to the vibrations caused when a round of ammunition impacts the joint 30.

**[0031]** The washer 46 on the back side of the plates 26 is preferably over-sized to give greater pinching force on the plates 26 when the nut 50 is tightened. While a backing plate can be used if desired, the secure engagement created by the beveled facing plate 34 is sufficiently strong that a backing plate is generally not necessary. Backing plates may be desirable, however, if high powered rounds are being used.

**[0032]** FIG. 4 shows a method for forming a joint 60 with



similar advantages when the plates 26 are disposed perpendicular to one another. Typically, an angle joint 64 is used to hold the two pieces of steel plate 26 together. The angle joint 64 has openings 90 through which bolts 92 extend. Tightening the bolts pinches the ends of the plates between the angle joint 64 and a washer or backing strip 96.

**[0033]** Unfortunately, the angle joint 64 can suffer the same problems as the flat joint discussed in FIGs. 1 and 2. These problems are resolved by providing a facing strip 68 which forms a flat plate. A bolt 72 is attached to the flat plate either by welding or by a bracket such as that discussed with respect to FIG. 3.

**[0034]** A channel 76 is formed in the angle joint 64 to allow the bolt 72 to pass therethrough and engage a washer 80 and nut 84. As the nut 84 is tightened, the bolt draws the facing strip 68 into contact with the plates 26 at an angle of about 45 degrees. The facing strip 26 covers the angle joint 64 and prevents splatter through the opening between the plates 26.

**[0035]** FIG. 5 shows a back view of the facing strip 34 and a plurality of brackets 38. Preferably, some of the brackets 38 are rotated 180 degrees from each other so that the openings 38a are on opposite sides of the brackets. This prevents the facing strip 34 from moving relative to the bolts 42 so that the bolts are pulled out of the brackets 38. Thus, the only way to remove

the facing strip 34 once it is in place is to undo the nuts behind the washer 46 or backing plate.

**[0036]** Turning now to FIG. 6, there is shown a side view of the facing plate or strip 68 discussed with respect to FIG. 4. The facing strip 68 is attached to a plurality of bolts 72. This can be accomplished by welding the bolts 72 to the facing strip 68 or by providing a plurality of brackets, such as those shown on the facing strip 34 in FIG. 5. For the reasons discussed above, the brackets are preferred. However, because the facing strip 68 is not holding the plates 26 together, the welds on the bolts will generally last longer than those on a facing plate such as that shown in FIG. 1.

**[0037]** FIG. 6A shows a back view and FIG. 6B shows an end view of the facing strip 68 discussed with respect to FIGS. 4 and 6. It is important to note that the spacing of the bolts 72 is not critical to the functioning of the facing plate 68. However, the bolts 72 need to align with the openings 76 in the angle joint 64 (FIG. 4) to facilitate mounting of the facing plate 68.

**[0038]** Turning now to FIGS. 7 through 7B, there are shown two side views and an end view of angle joints 64 which have been modified to provide channels 76 for the bolts (not shown) of the facing plate (not shown). The angle joints 64 also have openings 90 formed therein which are used to secure bolts 92 (FIG 4) which hold the angle joints 64 to the plates 26. The angle joints 64

are typically about 2.5 inches on each side, so that they provide adequate support without wasting material.

**[0039]** Thus there is disclosed an improved Joint for Bullet Traps. Those skilled in the art will appreciate numerous modifications which can be made without departing from the scope and spirit of the present invention. The appended claims are intended to cover such modifications.

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